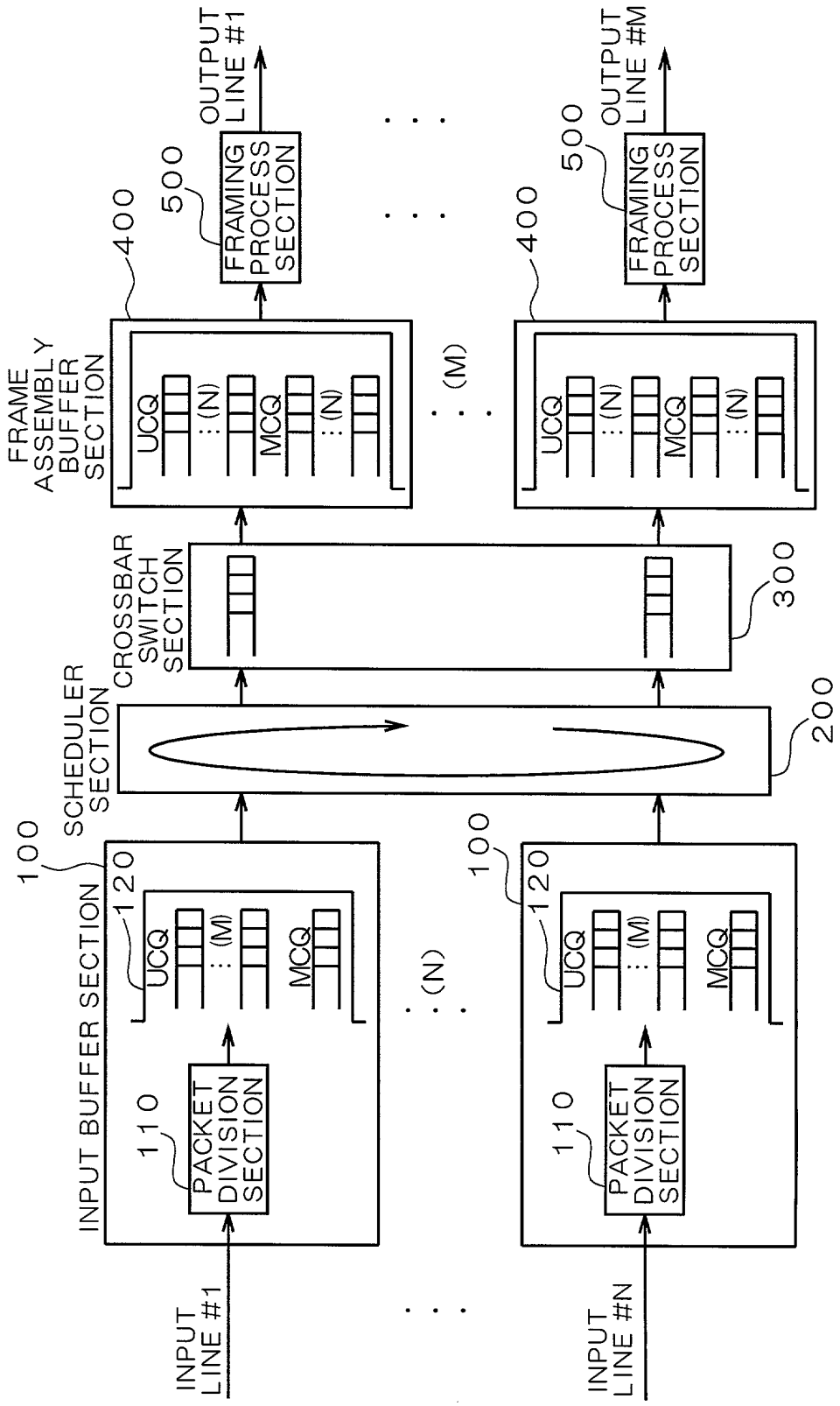
JP 6506160 B2

FIG. 1



TOTE80"0862h660

FIG. 2

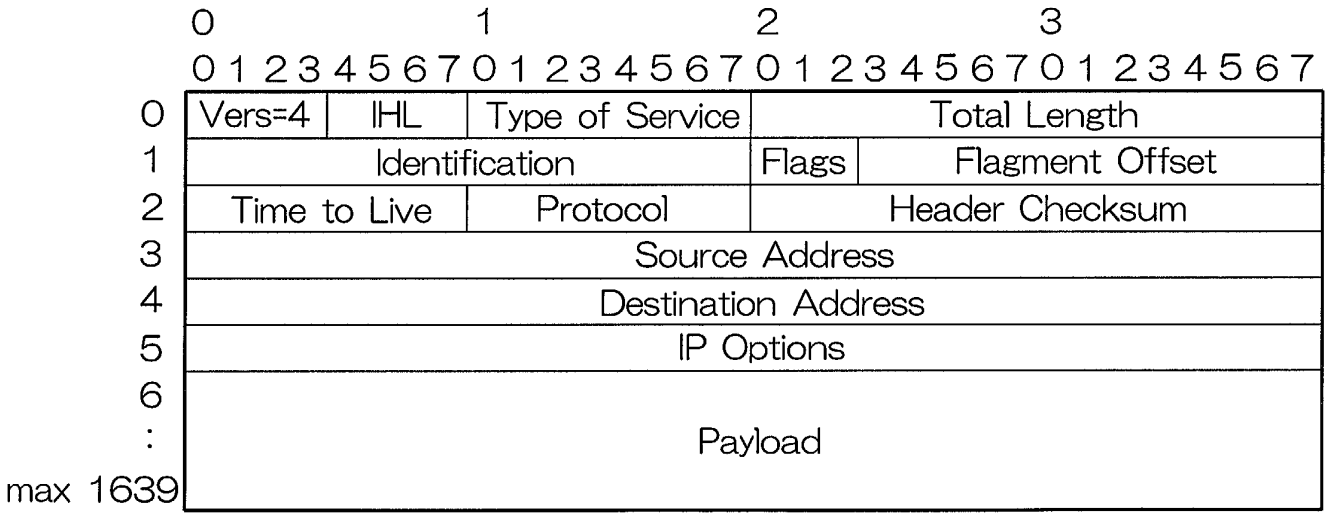
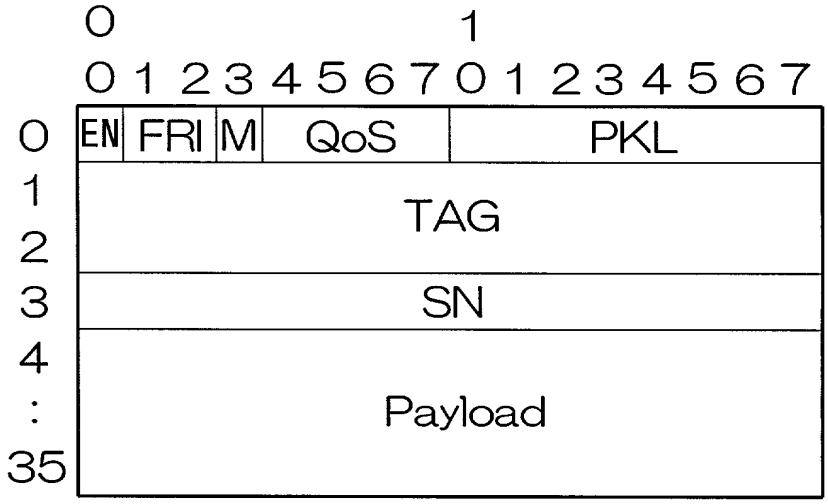


FIG. 3



SUBSTITUTE SHEET (RULE 26)

FIG. 4

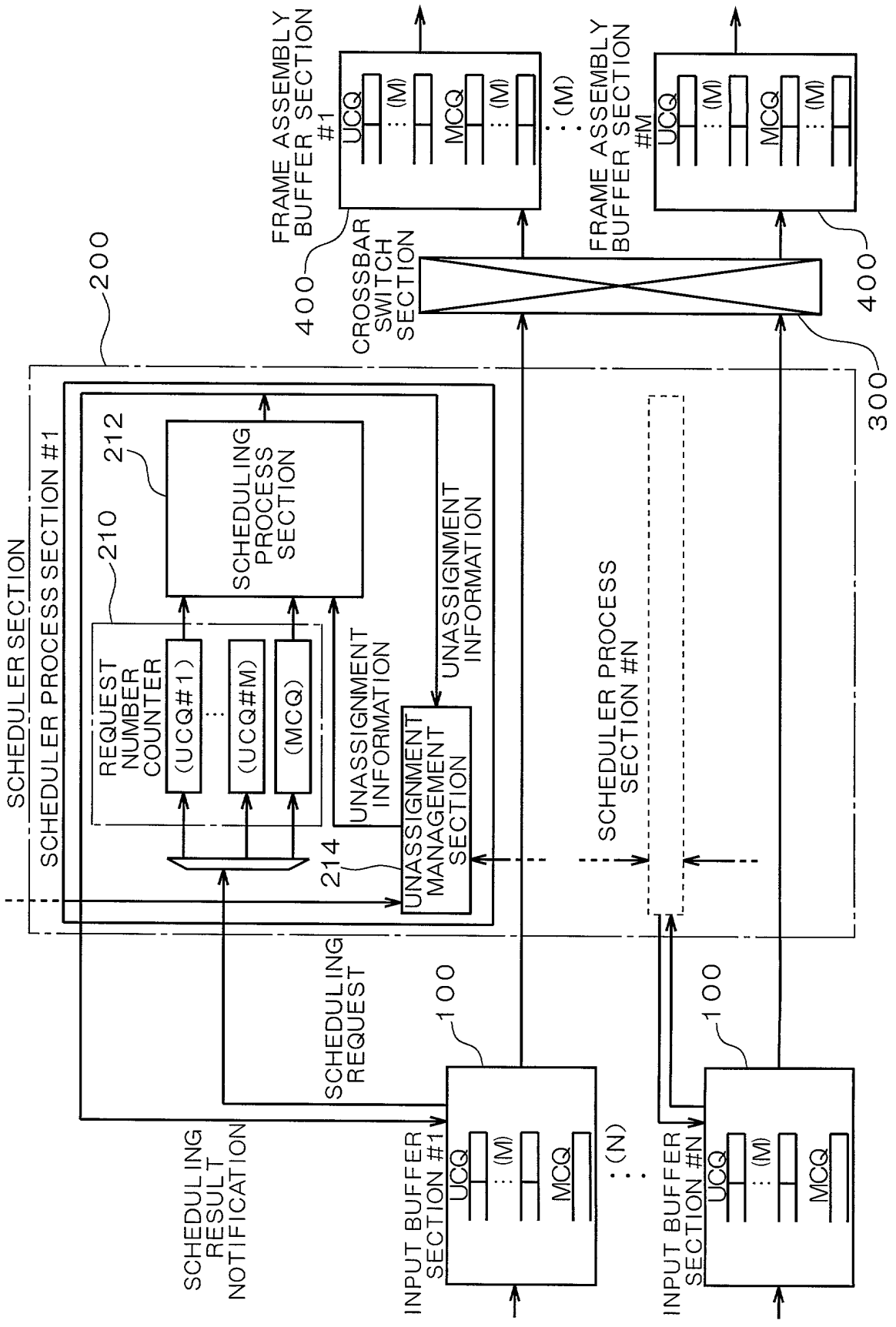

SCHEDULER SECTION
SCHEDULER PROCESS SECTION #1
200
210
212
REQUEST NUMBER COUNTER
(UCQ#1)
(UCQ#M)
(MCQ)
SCHEDULING PROCESS SECTION
UNASSIGNMENT INFORMATION
UNASSIGNMENT INFORMATION
214
UNASSIGNMENT MANAGEMENT SECTION
SCHEDULER PROCESS SECTION #N
SCHEDULING REQUEST
SCHEDULING RESULT NOTIFICATION
100
INPUT BUFFER SECTION #1
INPUT BUFFER SECTION #N
UCQ
MCQ
: (M)
: (N)
CROSSBAR SWITCH SECTION
300
400
FRAME ASSEMBLY BUFFER SECTION #1
FRAME ASSEMBLY BUFFER SECTION #M

FIG. 5

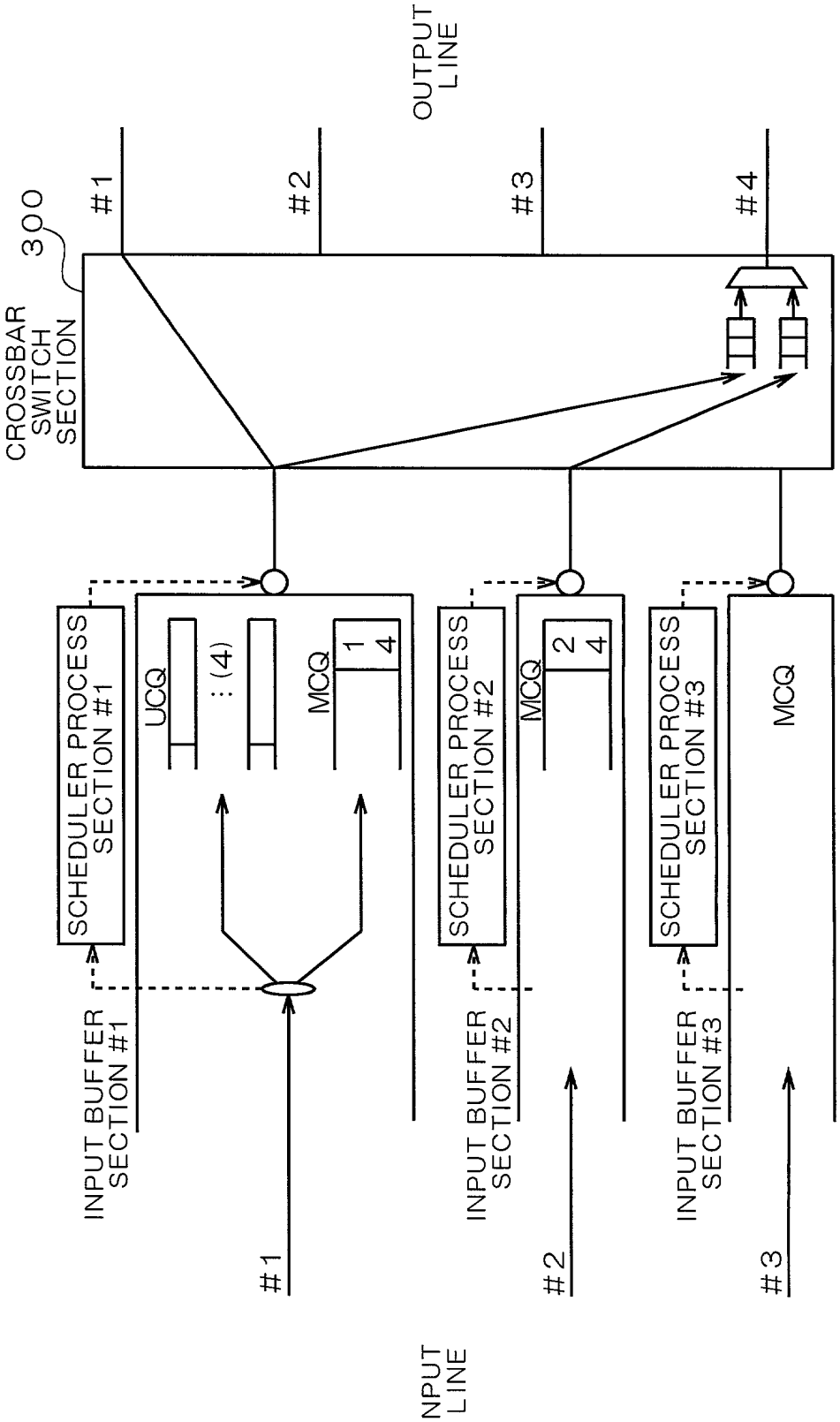

OUTPUT LINE
#1
#2
#3
#4
300
CROSSBAR SWITCH SECTION
SCHEDULER PROCESS SECTION #1
SCHEDULER PROCESS SECTION #2
SCHEDULER PROCESS SECTION #3
UCQ
: (4)
MCQ
1 4
2 4
INPUT BUFFER SECTION #1
INPUT BUFFER SECTION #2
INPUT BUFFER SECTION #3
INPUT LINE

FIG. 6

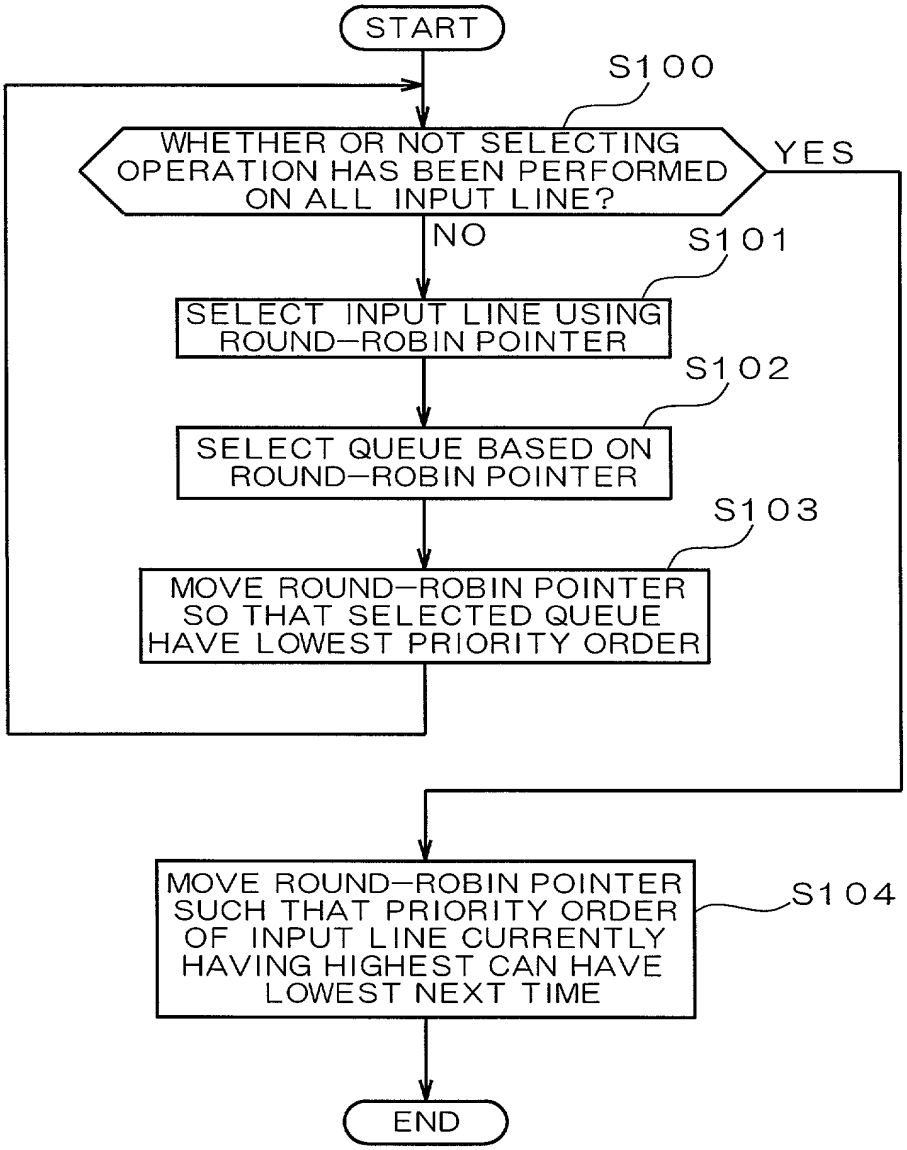


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FIG. 7A

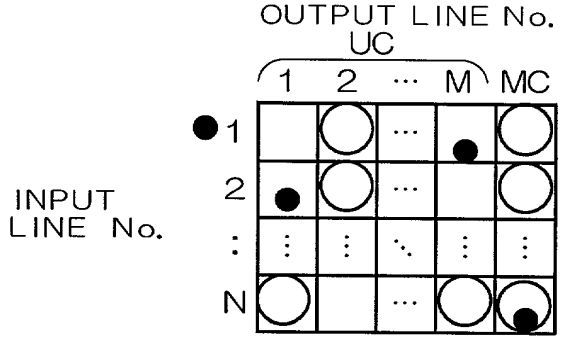

FIG. 7B

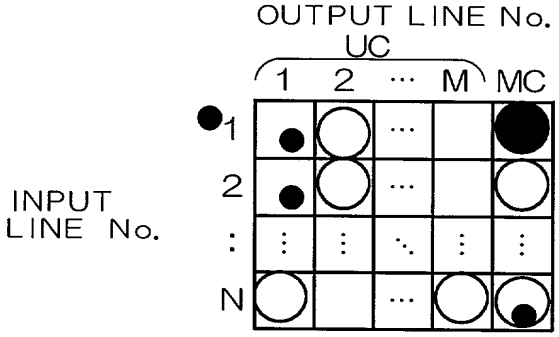

FIG. 7C

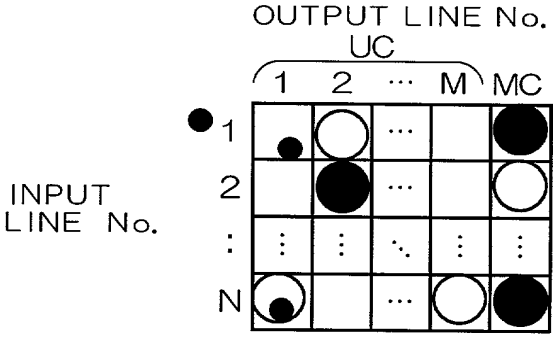

FIG. 7D

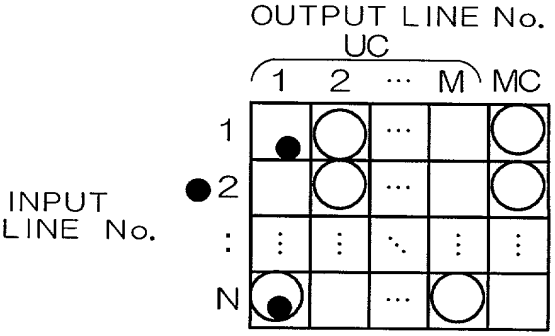

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FIG. 8

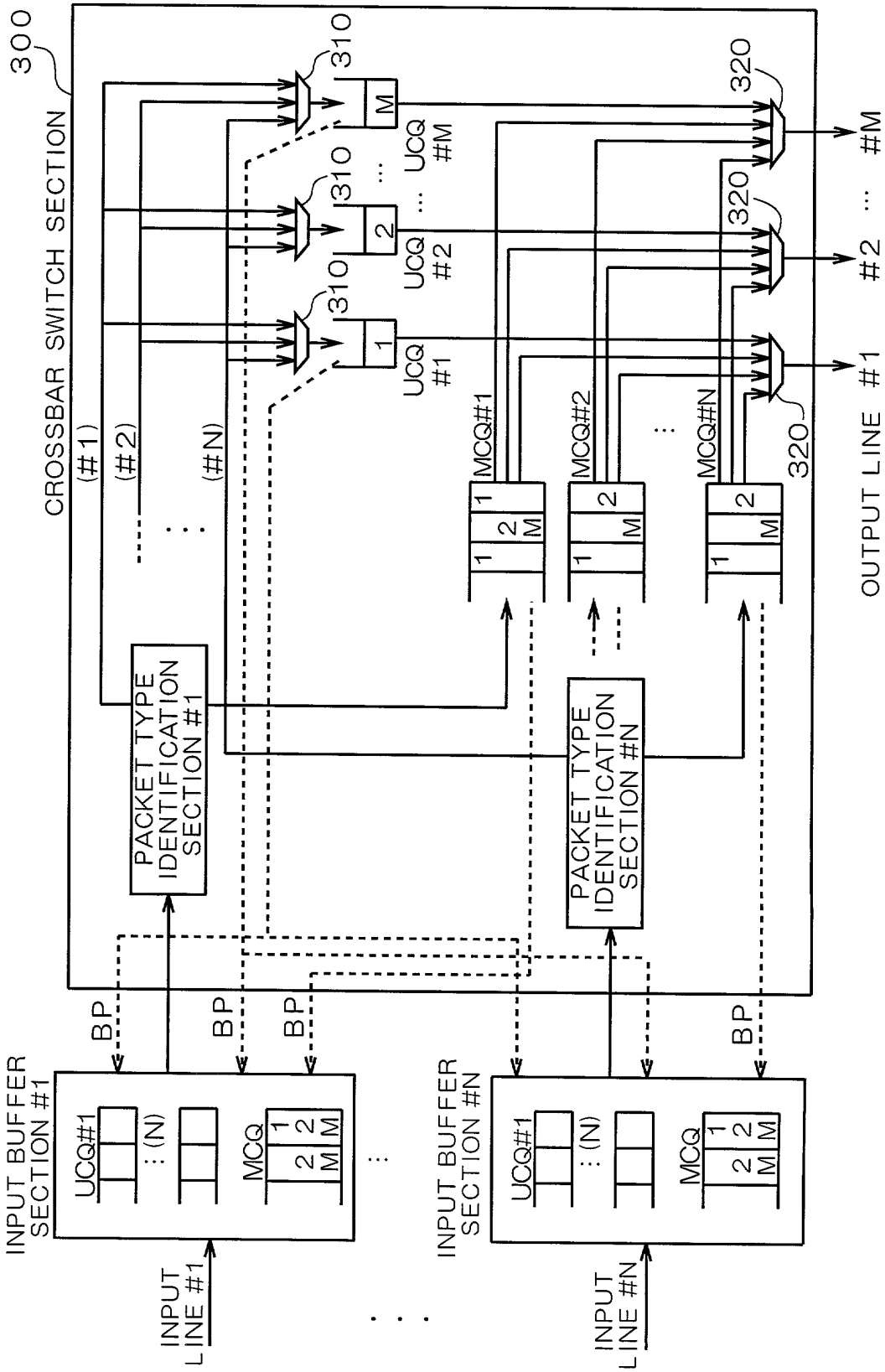
300
CROSSBAR SWITCH SECTION
(#1)
(#2)
(#N)
PACKET TYPE IDENTIFICATION SECTION #1
PACKET TYPE IDENTIFICATION SECTION #N
310
UCQ #1
UCQ #2
UCQ #M
MCQ#1
MCQ#2
MCQ#N
320
OUTPUT LINE #1
#2
#M
BP
INPUT BUFFER SECTION #1
INPUT BUFFER SECTION #N
UCQ#1
MCQ
INPUT LINE #1
INPUT LINE #N

FIG. 9

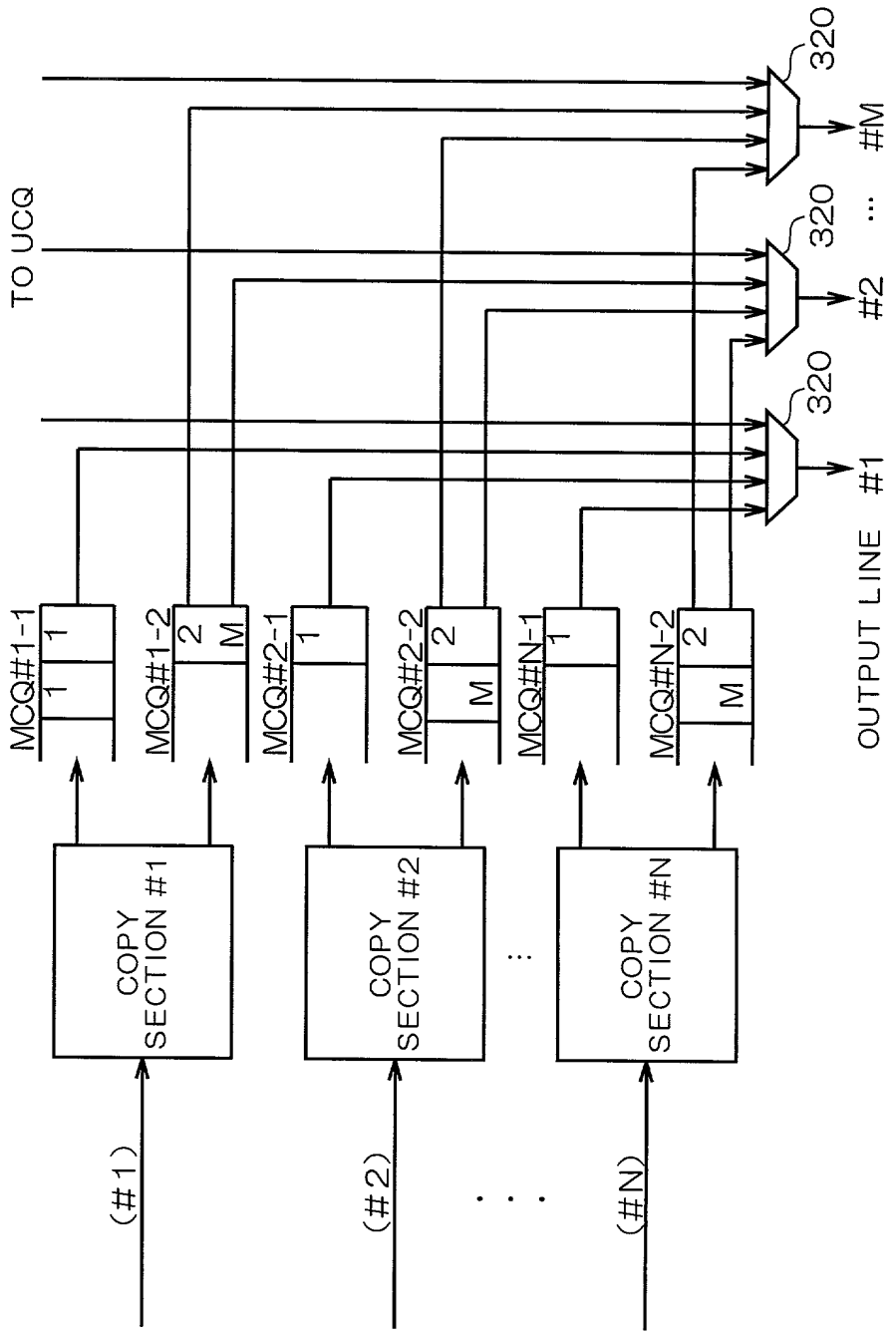
TO UCQ
320
320
320
#M
#2
#1
OUTPUT LINE
MCQ#1-1
MCQ#1-2
MCQ#2-1
MCQ#2-2
MCQ#N-1
MCQ#N-2
1
2
M
COPY SECTION #1
COPY SECTION #2
COPY SECTION #N
(#1)
(#2)
(#N)

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FIG. 10

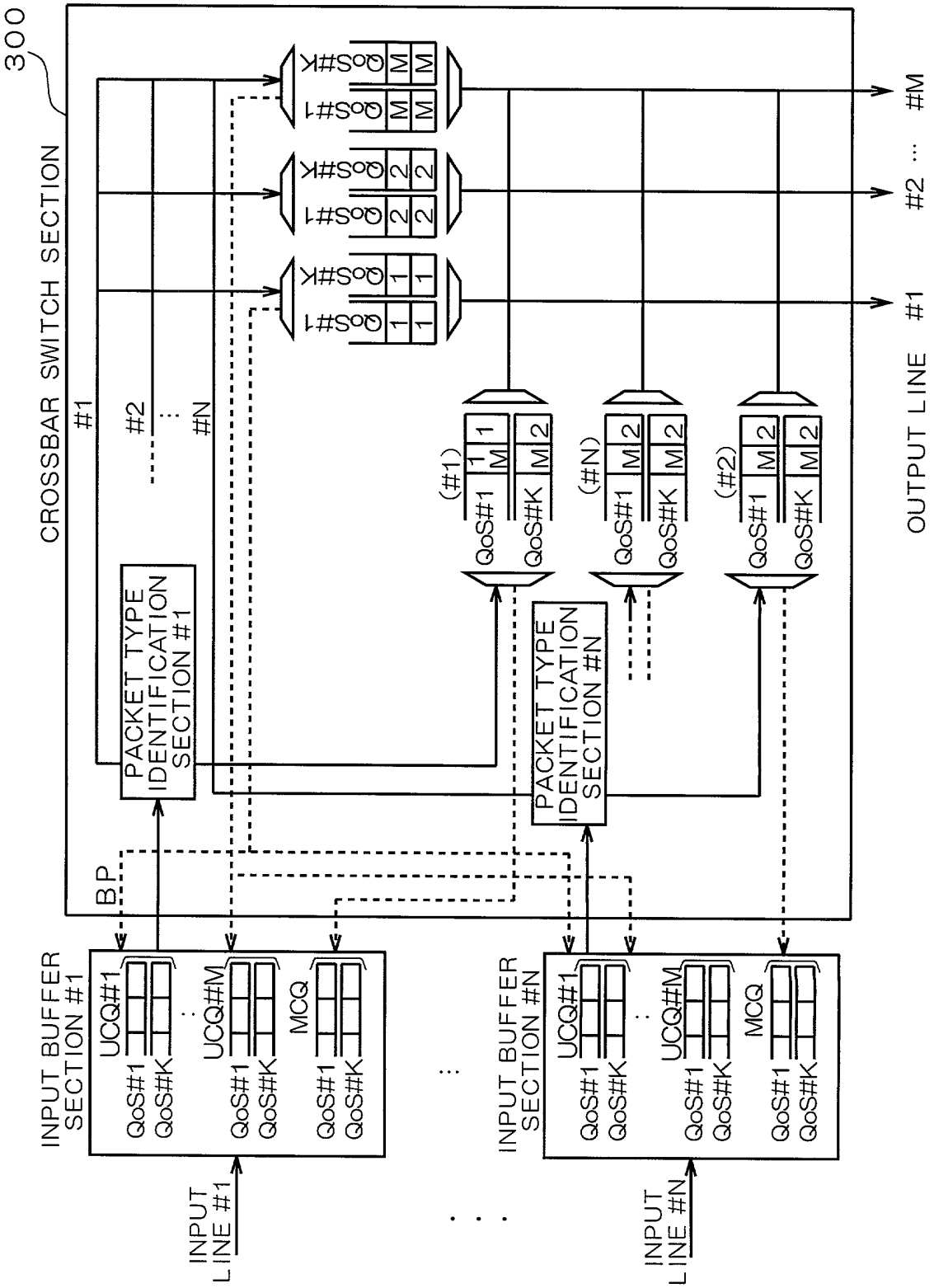


FIG. 11

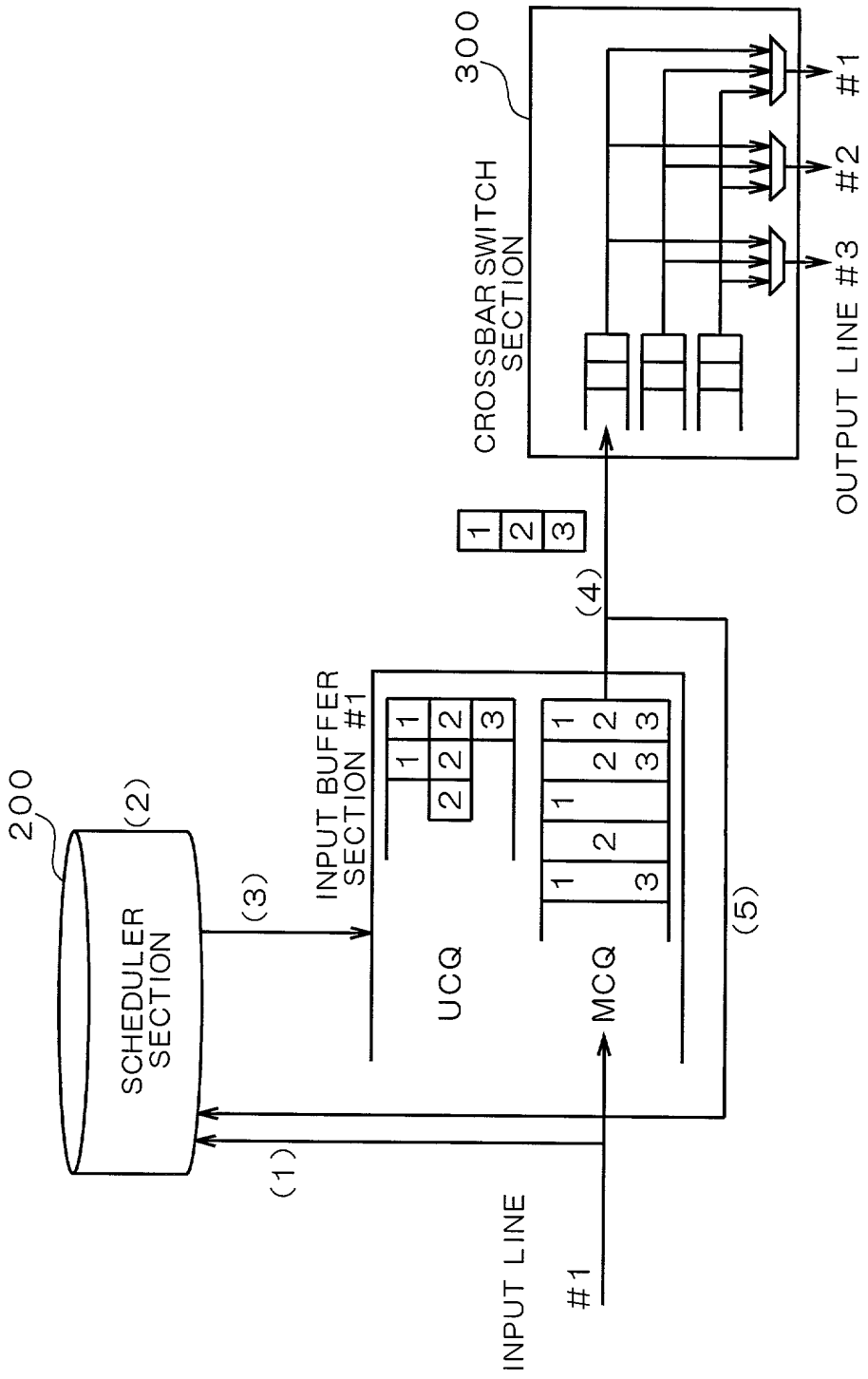

200
(2)
SCHEDULER SECTION
(3)
INPUT BUFFER SECTION #1
UCQ
MCQ
(4)
(5)
(1)
INPUT LINE #1
300
CROSSBAR SWITCH SECTION
OUTPUT LINE #1
OUTPUT LINE #2
OUTPUT LINE #3

FIG. 12

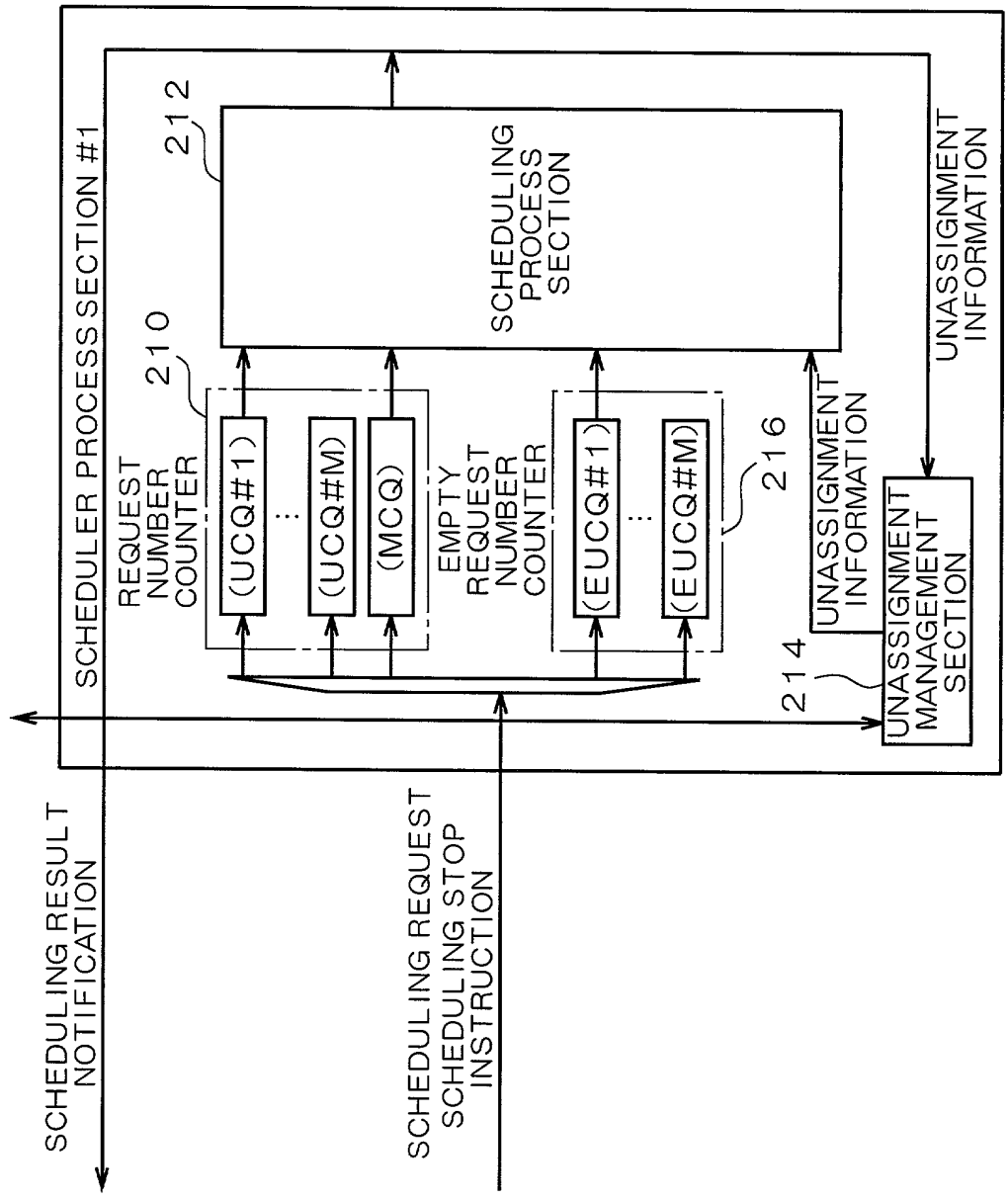
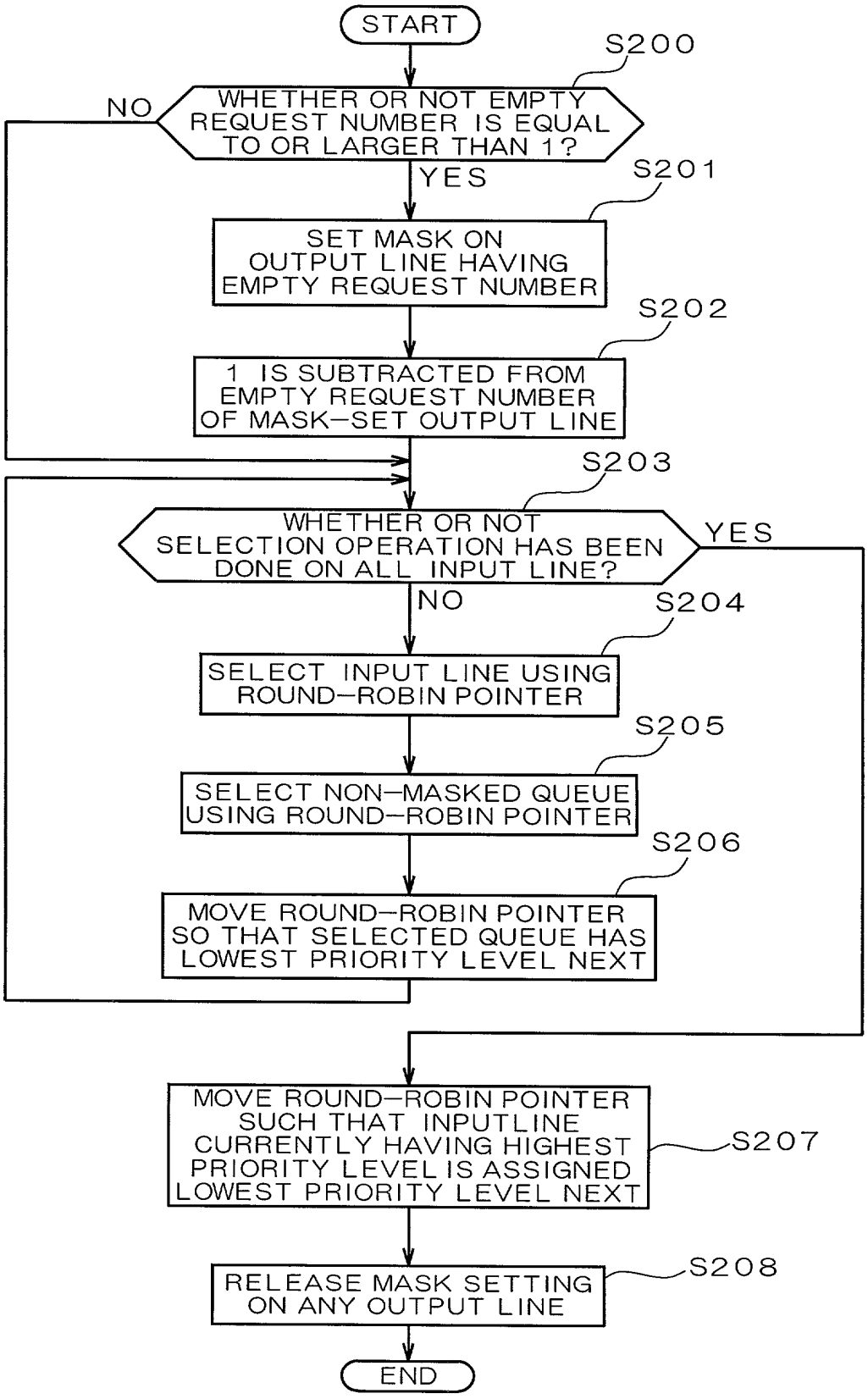

SCHEDULER PROCESS SECTION #1
212
SCHEDULING PROCESS SECTION
210
REQUEST NUMBER COUNTER
(UCQ#1)
(UCQ#M)
(MCQ)
EMPTY REQUEST NUMBER COUNTER
(EUCQ#1)
(EUCQ#M)
216
UNASSIGNMENT INFORMATION
UNASSIGNMENT INFORMATION
214
UNASSIGNMENT MANAGEMENT SECTION
SCHEDULING RESULT NOTIFICATION
SCHEDULING REQUEST SCHEDULING STOP INSTRUCTION

FIG. 13



US 6,934,294 B2

FIG. 14A

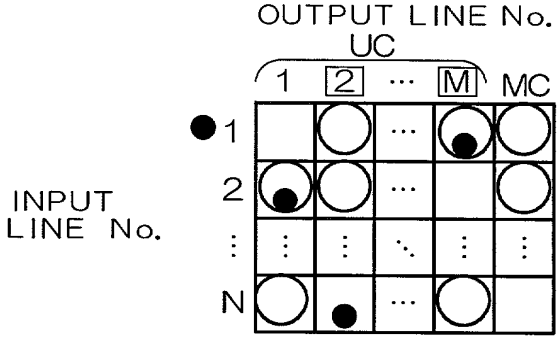


FIG. 14B

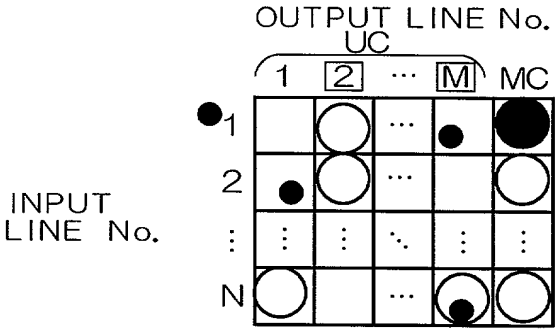


FIG. 14C

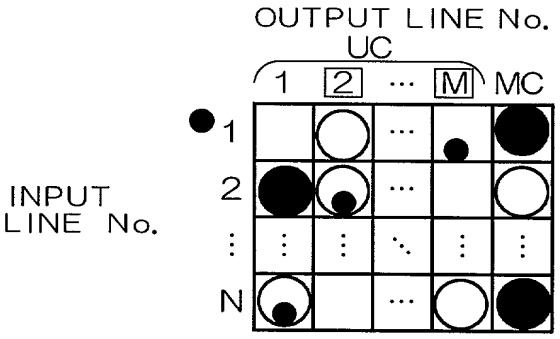


FIG. 14D

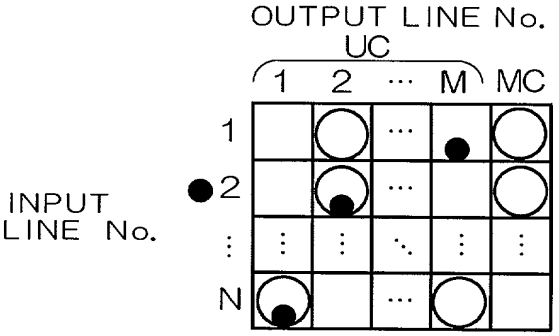


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FIG. 15

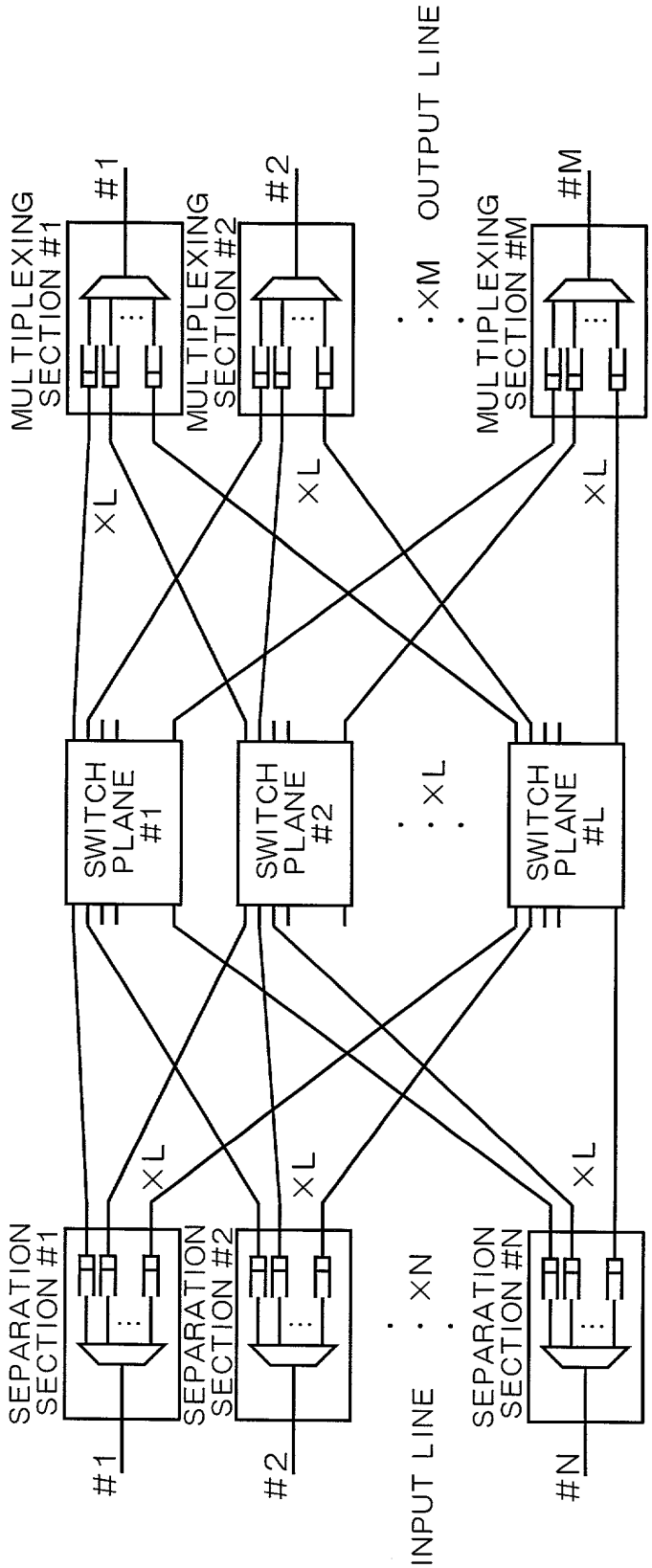
SEPARATION SECTION #1
SEPARATION SECTION #2
SEPARATION SECTION #N
#1
#2
#N
INPUT LINE
×N
×L
SWITCH PLANE #1
SWITCH PLANE #2
SWITCH PLANE #L
MULTIPLEXING SECTION #1
MULTIPLEXING SECTION #2
MULTIPLEXING SECTION #M
#1
#2
#M
×M
OUTPUT LINE

FIG. 16

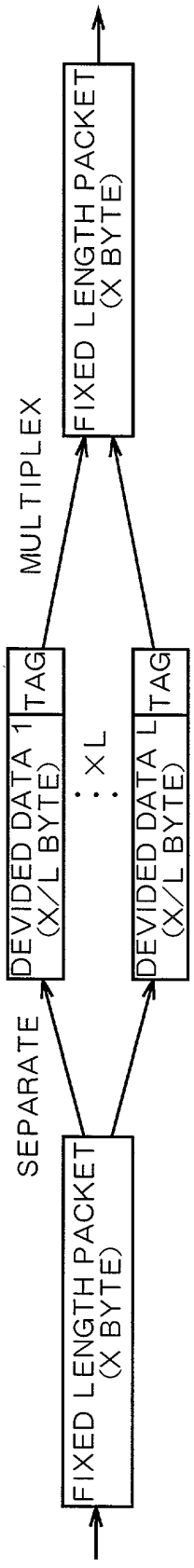
FIXED LENGTH PACKET
(X BYTE)
SEPARATE
DEVIDED DATA 1
(X/L BYTE)
TAG
: ×L
:
DEVIDED DATA L
(X/L BYTE)
TAG
MULTIPLEX
FIXED LENGTH PACKET
(X BYTE)

FIG. 17

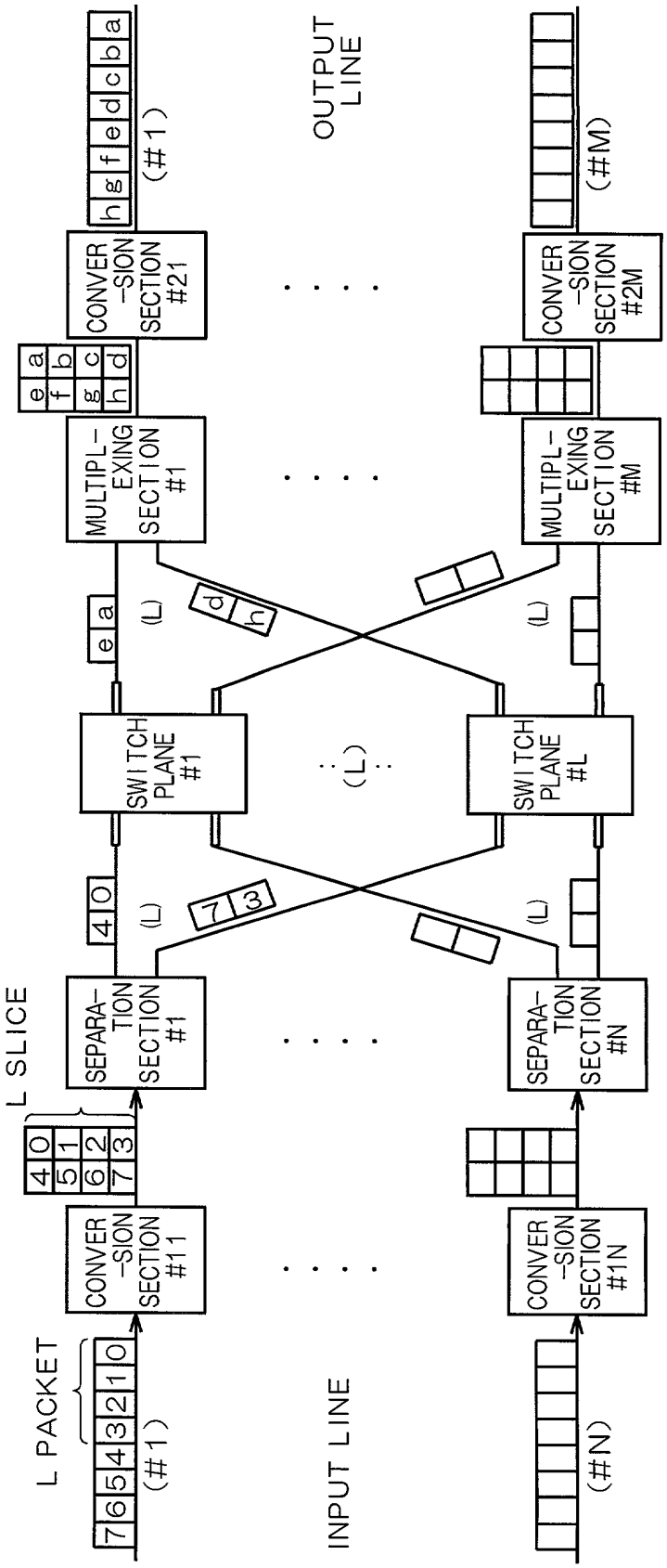
L PACKET
(#1)
7 6 5 4 3 2 1 0
INPUT LINE
(#N)
CONVER-SION SECTION #11
CONVER-SION SECTION #1N
L SLICE
4 0
5 1
6 2
7 3
SEPARA-TION SECTION #1
SEPARA-TION SECTION #N
4 0
7 3
(L)
SWITCH PLANE #1
SWITCH PLANE #L
e a
d h
MULTIPL-EXING SECTION #1
MULTIPL-EXING SECTION #M
e a
f b
g c
h d
CONVER-SION SECTION #21
CONVER-SION SECTION #2M
h g f e d c b a
(#1)
(#M)
OUTPUT LINE

FIG. 18

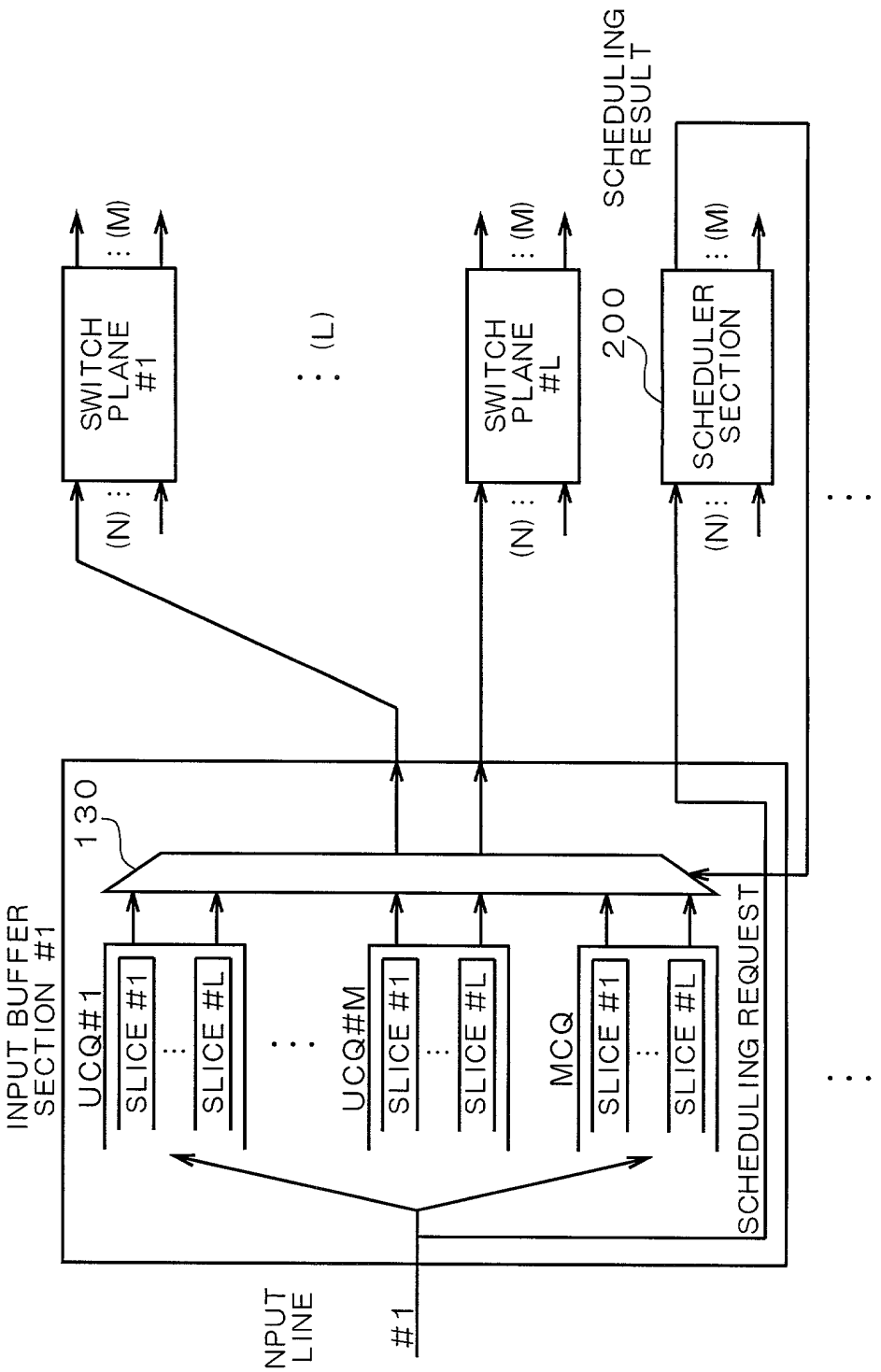
INPUT LINE
#1
INPUT BUFFER SECTION #1
130
UCQ#1
SLICE #1
SLICE #L
UCQ#M
MCQ
SCHEDULING REQUEST
SWITCH PLANE #1
SWITCH PLANE #L
(N)
(M)
(L)
200
SCHEDULER SECTION
SCHEDULING RESULT

FIG. 19

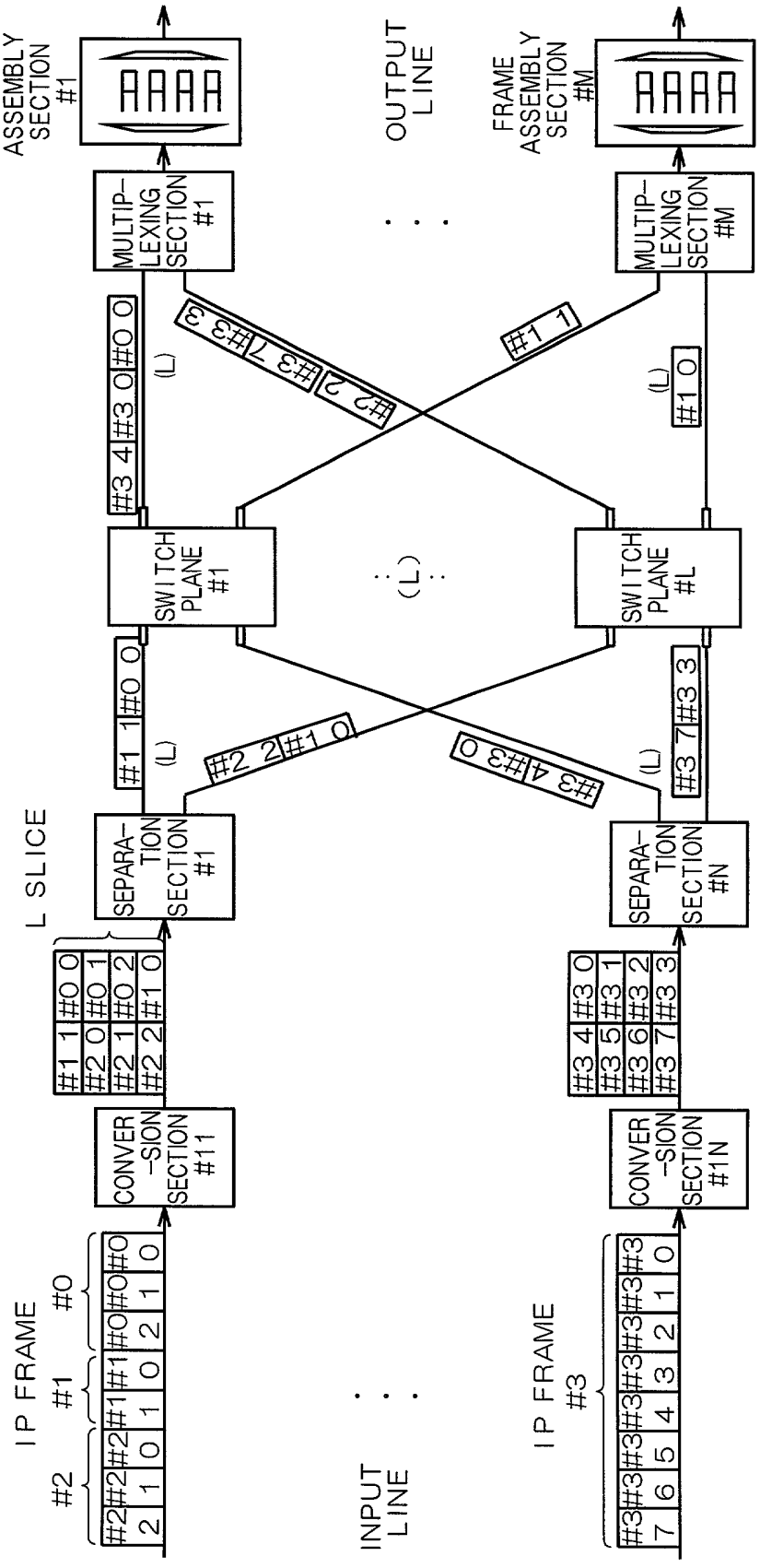
INPUT LINE
OUTPUT LINE
IP FRAME #2
IP FRAME #3
CONVER-SION SECTION #11
CONVER-SION SECTION #1N
SEPARA-TION SECTION #1
SEPARA-TION SECTION #N
L SLICE
SWITCH PLANE #1
SWITCH PLANE #L
MULTIP-LEXING SECTION #1
MULTIP-LEXING SECTION #M
FRAME ASSEMBLY SECTION #1
FRAME ASSEMBLY SECTION #M
(L)

FIG. 20

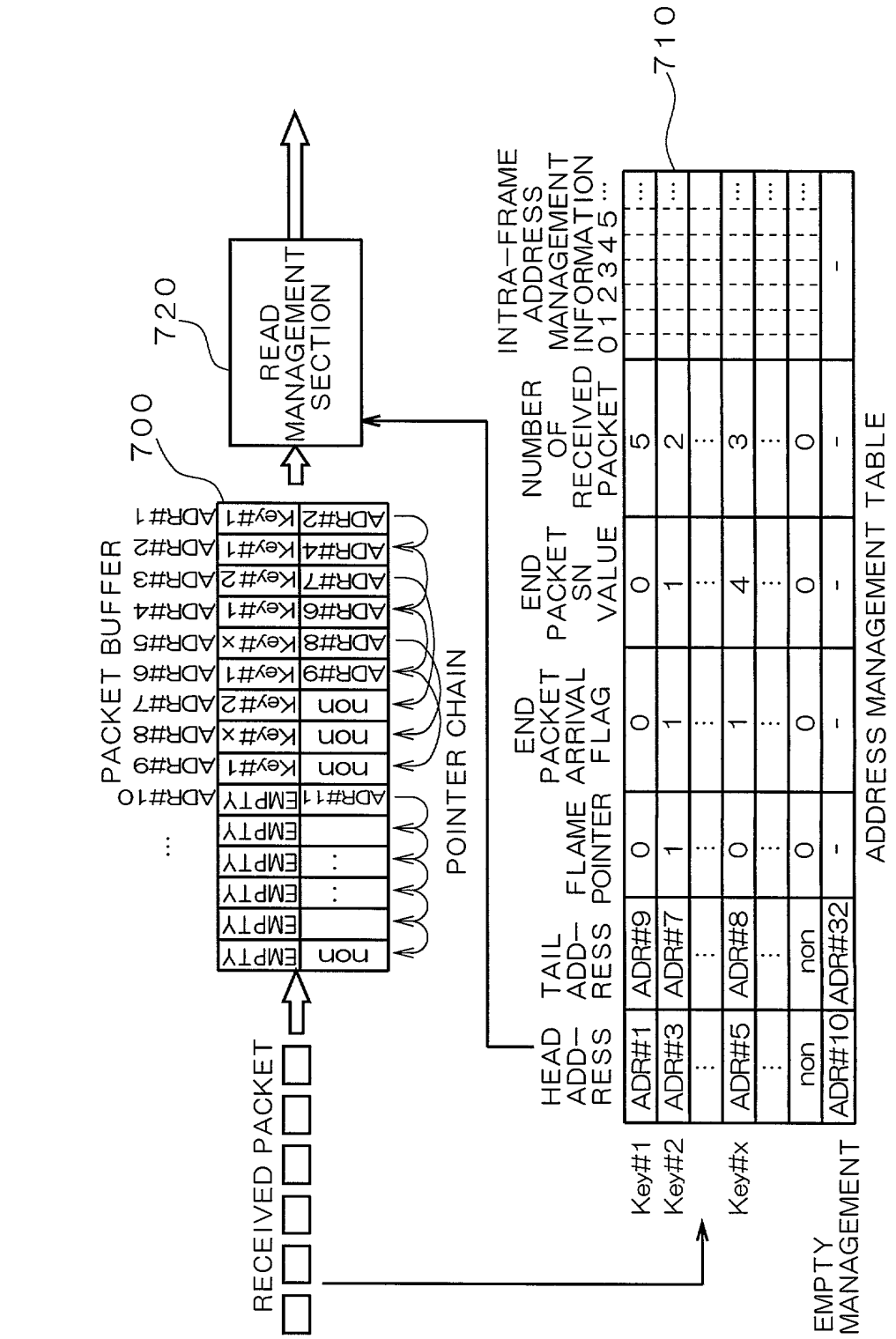
RECEIVED PACKET
PACKET BUFFER
700
READ MANAGEMENT SECTION
720
POINTER CHAIN
HEAD ADDRESS
TAIL ADDRESS
FLAME POINTER
END PACKET ARRIVAL FLAG
END PACKET SN VALUE
NUMBER OF RECEIVED PACKET
INTRA-FRAME ADDRESS MANAGEMENT INFORMATION 0 1 2 3 4 5 ...
710
Key#1
Key#2
Key#x
EMPTY MANAGEMENT
ADDRESS MANAGEMENT TABLE

FIG. 21

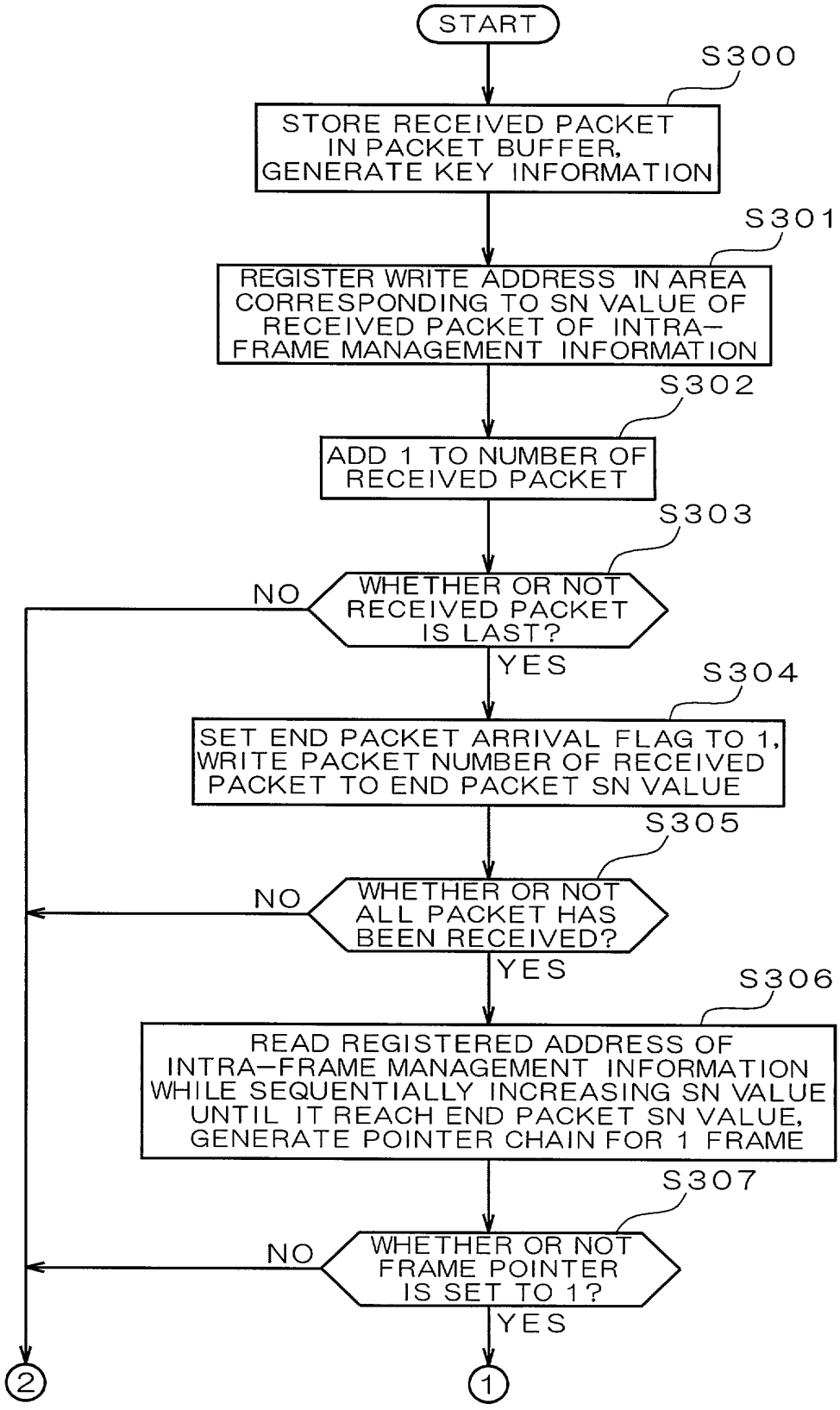

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FIG. 22

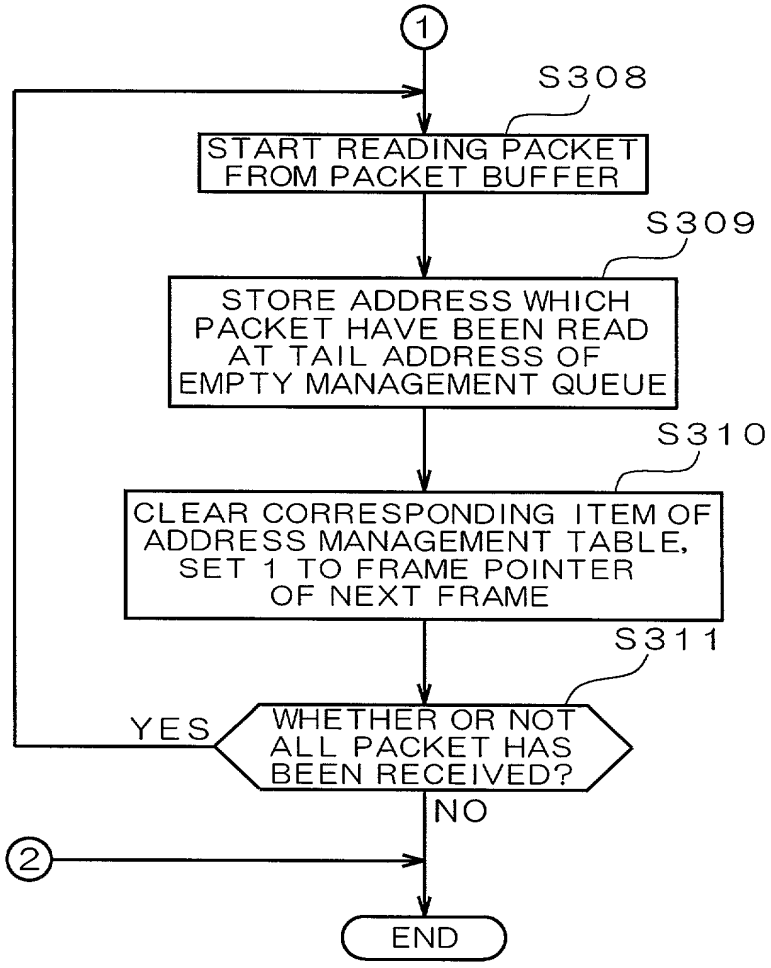

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FIG. 23

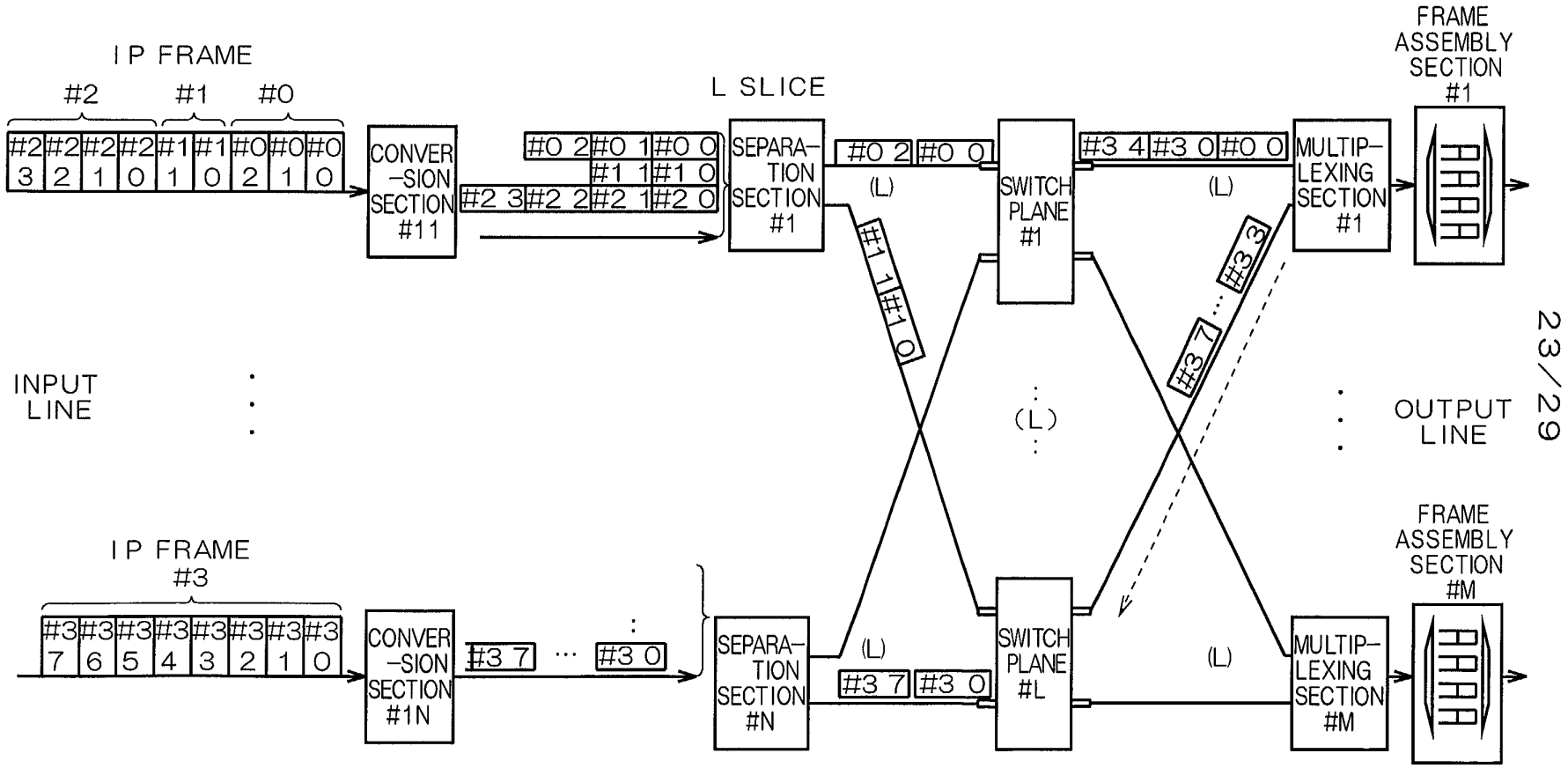
IP FRAME
#2
#1
#0
#2 3 #2 2 #2 1 #2 0 #1 1 #1 0 #0 2 #0 1 #0 0
CONVER-SION SECTION #11
#0 2 #1 1 #0 0
#2 3 #2 2 #2 1 #2 0
L SLICE
SEPARA-TION SECTION #1
#0 2 #0 0
(L)
#1 1 #1 0
SWITCH PLANE #1
#3 4 #3 0 #0 0
(L)
#3 3
#3 7
MULTIP-LEXING SECTION #1
FRAME ASSEMBLY SECTION #1
INPUT LINE
(L)
OUTPUT LINE
IP FRAME
#3
#3 7 #3 6 #3 5 #3 4 #3 3 #3 2 #3 1 #3 0
CONVER-SION SECTION #1N
#3 7 ... #3 0
SEPARA-TION SECTION #N
(L)
#3 7 #3 0
SWITCH PLANE #L
(L)
MULTIP-LEXING SECTION #M
FRAME ASSEMBLY SECTION #M

FIG. 24

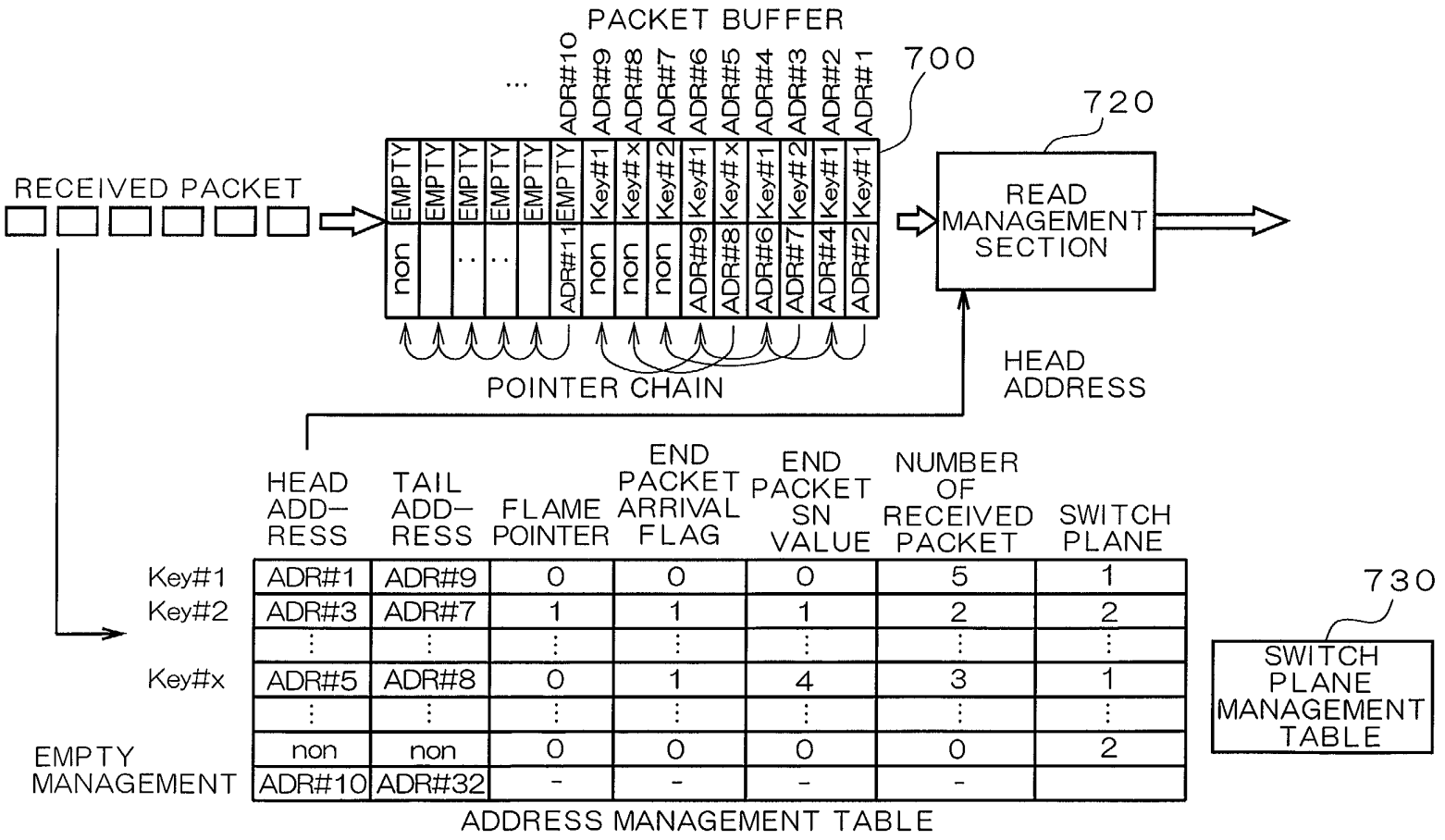
PACKET BUFFER
700
720
RECEIVED PACKET
READ MANAGEMENT SECTION
POINTER CHAIN
HEAD ADDRESS
HEAD ADD-RESS
TAIL ADD-RESS
FLAME POINTER
END PACKET ARRIVAL FLAG
END PACKET SN VALUE
NUMBER OF RECEIVED PACKET
SWITCH PLANE
Key#1
Key#2
Key#x
EMPTY MANAGEMENT
ADDRESS MANAGEMENT TABLE
730
SWITCH PLANE MANAGEMENT TABLE

FIG. 25

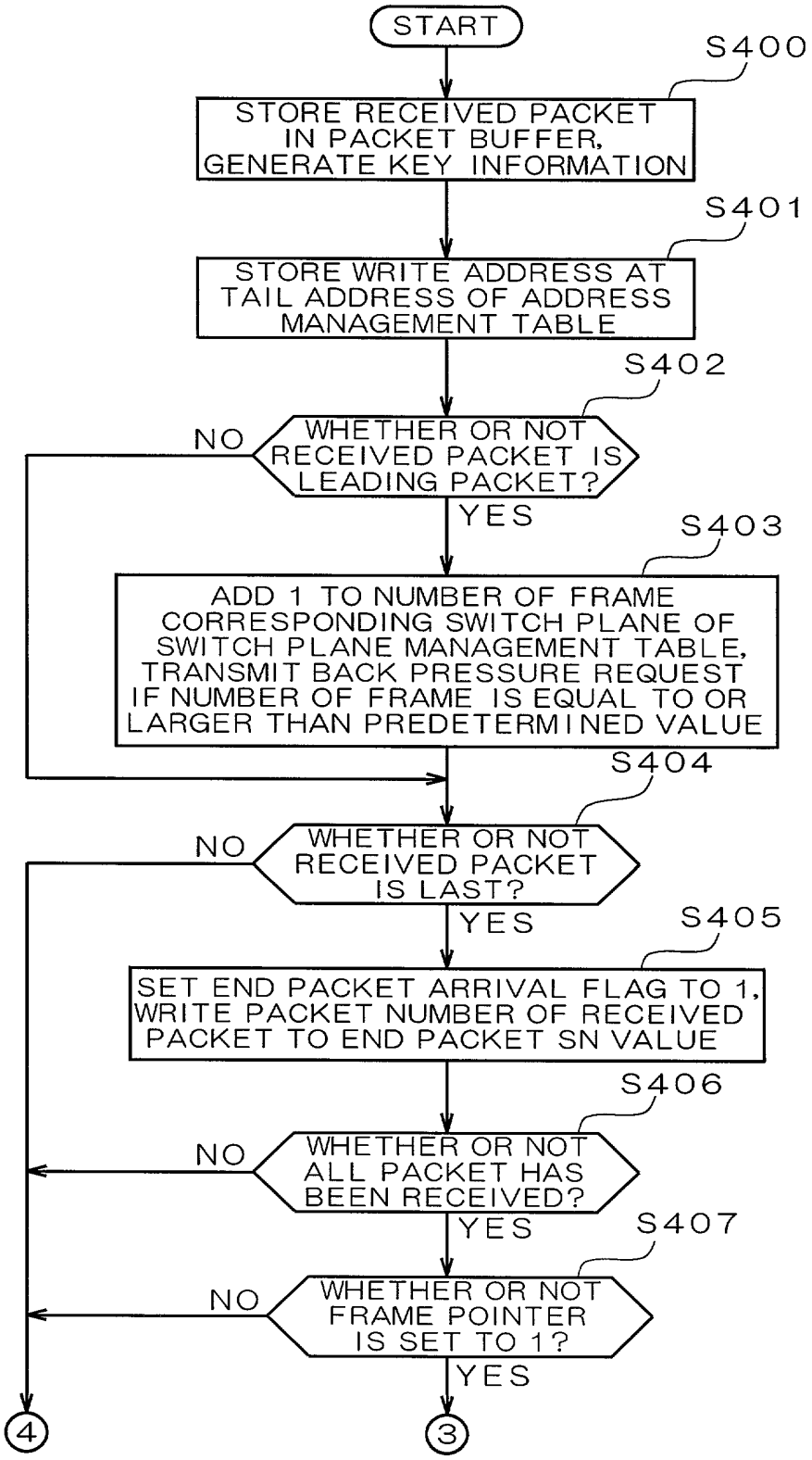

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FIG. 26

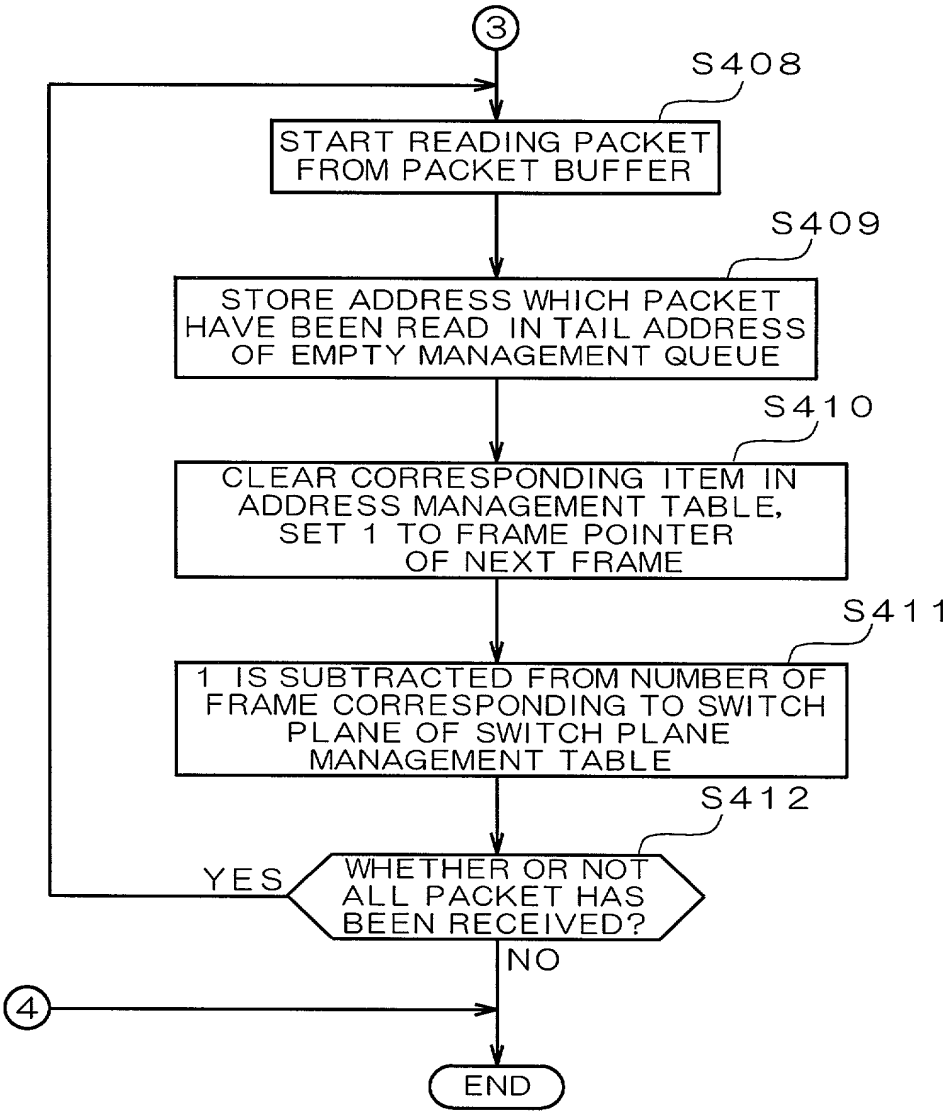

③
S408
START READING PACKET FROM PACKET BUFFER
S409
STORE ADDRESS WHICH PACKET HAVE BEEN READ IN TAIL ADDRESS OF EMPTY MANAGEMENT QUEUE
S410
CLEAR CORRESPONDING ITEM IN ADDRESS MANAGEMENT TABLE, SET 1 TO FRAME POINTER OF NEXT FRAME
S411
1 IS SUBTRACTED FROM NUMBER OF FRAME CORRESPONDING TO SWITCH PLANE OF SWITCH PLANE MANAGEMENT TABLE
S412
WHETHER OR NOT ALL PACKET HAS BEEN RECEIVED?
YES
NO
④
END

FIG. 27

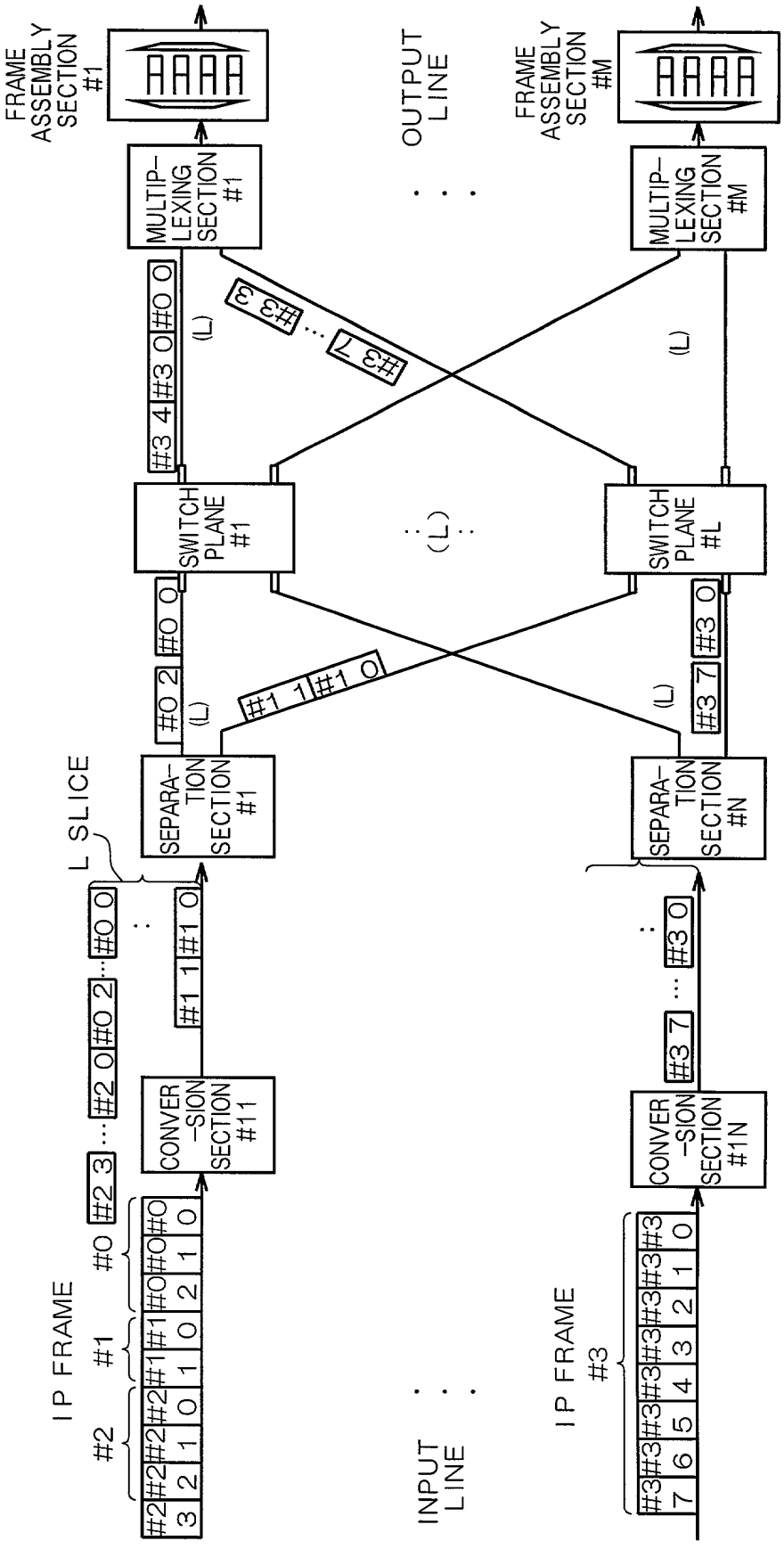

IP FRAME
#2
#1
#0
#2 3 ··· #2 0 #0 2 ··· #0 0
#1 1 #1 0
CONVER-SION SECTION #11
L SLICE
SEPARA-TION SECTION #1
#0 2 #0 0
#1 1 #1 0
(L)
SWITCH PLANE #1
#3 4 #3 0 #0 0
#3 3 ··· #3 7
MULTIP-LEXING SECTION #1
FRAME ASSEMBLY SECTION #1
INPUT LINE
OUTPUT LINE
IP FRAME
#3
#3 7 ··· #3 0
CONVER-SION SECTION #1N
SEPARA-TION SECTION #N
#3 7 #3 0
SWITCH PLANE #L
MULTIP-LEXING SECTION #M
FRAME ASSEMBLY SECTION #M

FIG. 28

PRIOR ART

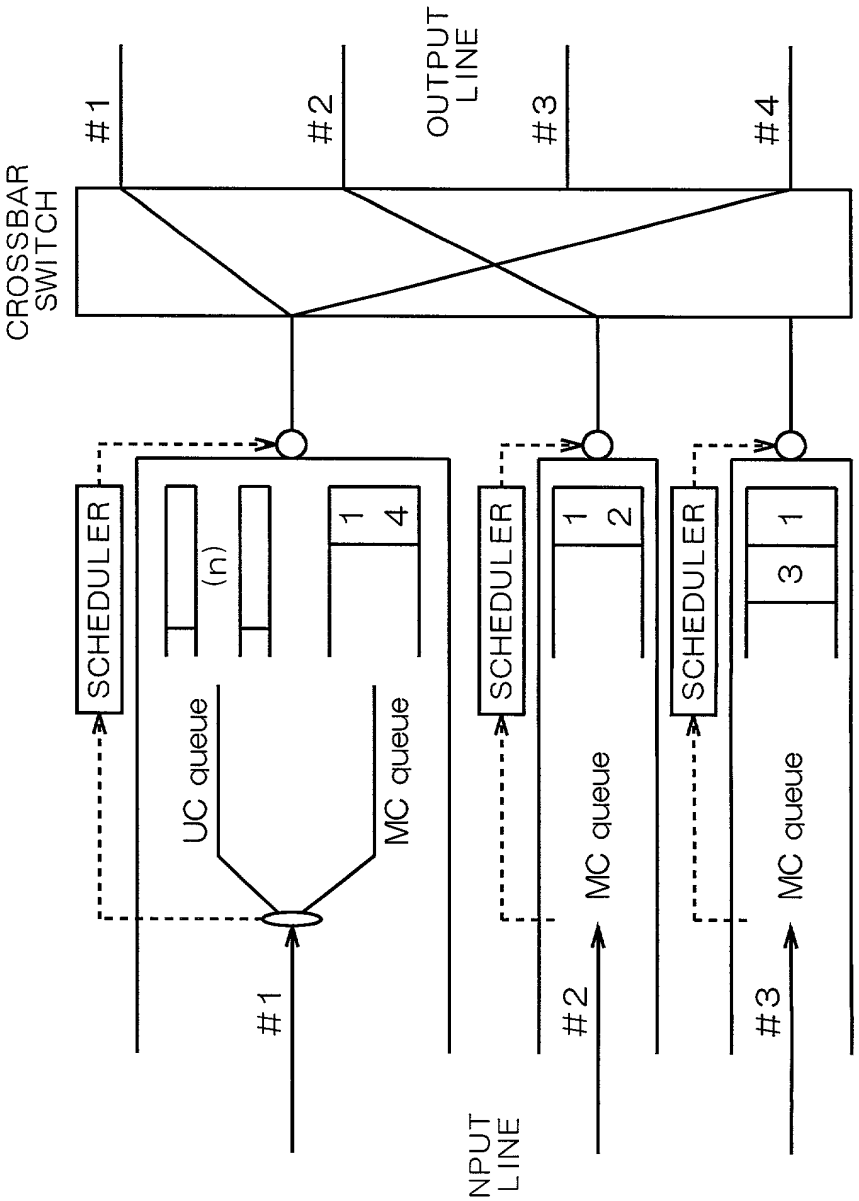
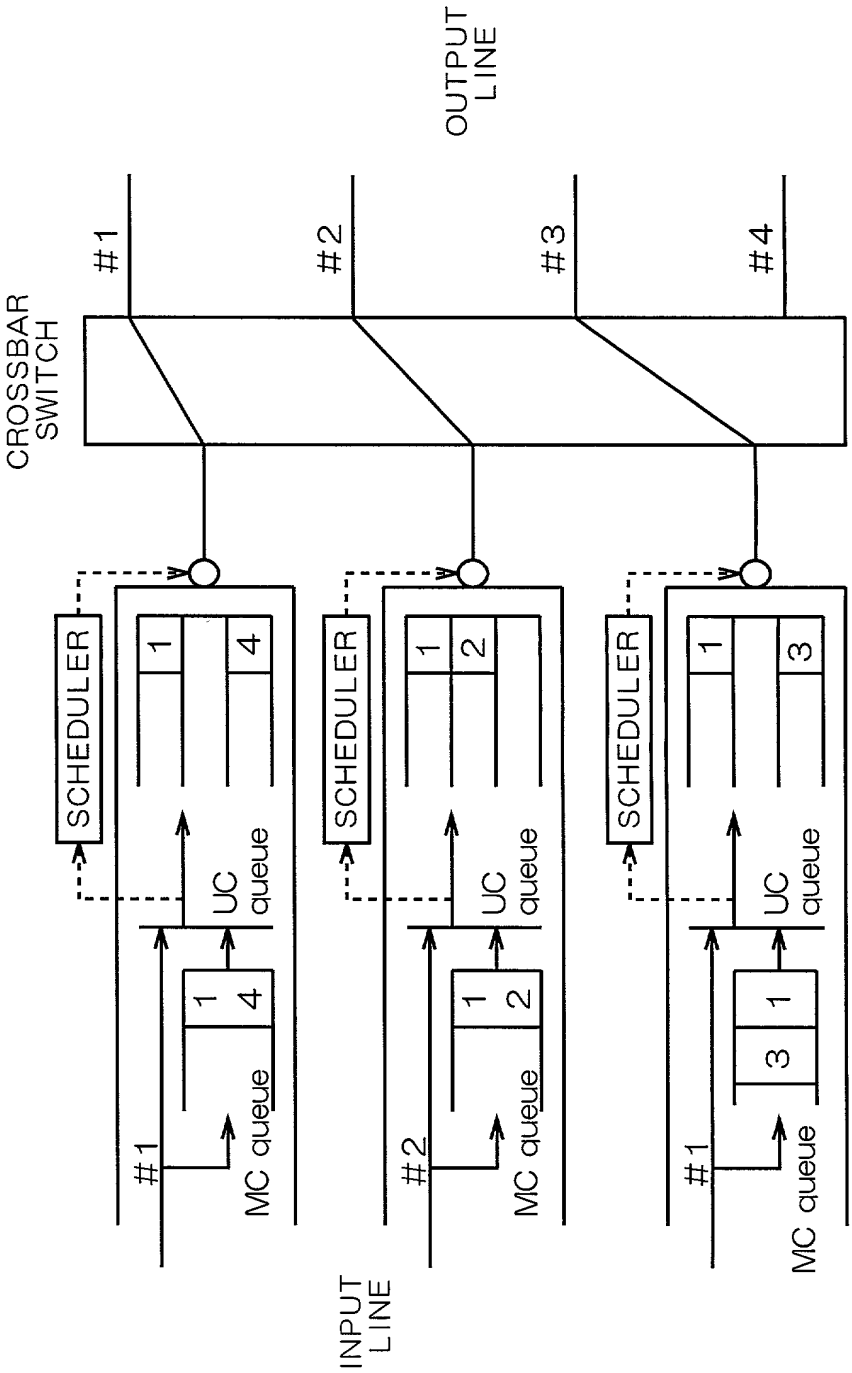


FIG. 29

PRIOR ART